CLAIMS:

1. A method of decomposing nitrogen dioxide (NO_2) to nitrogen monoxide (NO) in an exhaust gas of a lean-burn internal combustion engine, which method comprising adjusting the C1 hydrocarbon : nitrogen oxides (C1 $HC:NO_x$) ratio of the exhaust gas to from 0.1 to 2 and contacting this gas mixture with a particulate acidic refractory oxide selected from the group consisting of zeolites, tungsten-doped titania, silica-titania, zirconia-titania, gamma-alumina, amorphous silica-alumina and mixtures of any two or more thereof and passing the effluent gas to atmosphere.

2. A method according to claim 1, wherein the particulate refractory oxide supports a metal or a compound thereof, which metal being selected from the group consisting of rhodium, palladium, iron, copper and mixtures of any two or more thereof.

3. A method according to Claim 1 or 2, wherein the C1 $HC:NO_2$ ratio is adjusted to from 0.05 to 1.

4. A method according to claim 1, 2 or 3, wherein the step of adjusting the C1 $HC:NO_x$ ratio is done at above 250°C.

5. A method according to claim 4, wherein the step of adjusting the C1 $HC:NO_x$ ratio is done at up to 500°C.

6. A method according to any preceding claim, wherein the hydrocarbon is diesel fuel, gasoline fuel, natural gas (NG) or liquid petroleum gas (LPG), preferably diesel fuel.

7. An exhaust system for an internal combustion engine, which system comprising a catalyst for decomposing nitrogen dioxide (NO_2) to nitrogen monoxide (NO) with a suitable reductant, and means, in use, for adjusting the C1 hydrocarbon : nitrogen oxides (C1 $HC:NO_x$) ratio in an exhaust gas upstream of the catalyst to from 0.01 to 2, which catalyst consisting of a particulate acidic refractory oxide selected from the group consisting of zeolites, tungsten-doped titania, silica-titania, zirconia-titania, gamma-

alumina, amorphous silica-alumina and mixtures of any two or more thereof optionally supporting a metal or a compound thereof, which metal being selected from the group consisting of rhodium, palladium, iron, copper and mixtures of any two or more thereof.

8. An exhaust system according to claim 7, wherein at least one zeolite is ZSM-5, β-zeolite, Y-zeolite or mordenite.

9. An exhaust system according to claim 7 or 8, wherein the silica to alumina molar ratio is from 25 to 400, optionally from 30 to 80.

10. An exhaust system according to claim 7 or 8, wherein the tungsten, silica or zirconia is present in the tungsten-titania, silica-titania and zirconia-titania respectively in an amount of from 5 to 15 wt% based on the total weight of the particulate refractory oxide.

11. An exhaust system according to claim 7, 8, 9 or 10, wherein the particulate refractory oxide contains from 0.1 to 5.0 wt% rhodium based on the total weight of the particulate refractory oxide.

12. An exhaust system according to claim 11, wherein the particulate refractory oxide contains from 0.25 to 2.5 wt% rhodium based on the total weight of the particulate refractory oxide.

13. An exhaust system according to claim 7, 8, 9 or 10, wherein the particulate refractory oxide contains from 0.1 to 5.0 wt% palladium based on the total weight of the refractory oxide particulate.

14. An exhaust system according to claim 13, wherein the particulate refractory oxide contains from 0.25 to 2.5 wt% palladium based on the total weight of the particulate refractory oxide.

15. An exhaust system according to claim 7, 8, 9 or 10, wherein the particulate refractory oxide contains from 1 to 10 wt% copper based on the total weight of the particulate refractory oxide.

16. An exhaust system according to claim 15, wherein the particulate refractory oxide contains from 2.5 to 7.5 wt% copper based on the total weight of the particulate refractory oxide.

17. An exhaust system according to claim 7, 8, 9 or 10, wherein the at least one support contains from 1 to 10 wt% iron based on the total weight of the particulate refractory oxide.

18. An exhaust system according to claim 17, wherein the particulate refractory oxide contains from 2.5 to 7.5 wt% iron based on the total weight of the particulate refractory oxide.

19. An exhaust system according to any of claims 7, 8, 9, 10, 15 or 16, wherein the catalyst consists essentially of 5 wt% copper on zeolite ZSM-5 and/or β-zeolite.

20. An exhaust system according to any of claims 7, 8, 9, 10, 17 or 18, wherein the catalyst consists essentially of 5 wt% iron on zeolite ZSM-5 and/or β-zeolite.

21. An exhaust system according to any of claims 7, 8, 9, 10, 13 or 14, wherein the catalyst consists essentially of 2 wt% palladium on tungsten-titania.

22. An exhaust system according to any of claims 7 to 12, wherein the catalyst consists essentially of 0.5 wt% rhodium on gamma alumina.

23. An exhaust system according to any of claims 7 to 22, wherein the means for adjusting is adapted to adjust the C1 HC:NO_2 ratio of the exhaust gas to from 0.05 to 1.

24. An exhaust system according to any of claims 7 to 23, wherein the adjustment means is controlled, in use, to operate when the exhaust gas temperature is above 250°C.

25. An exhaust system according to claim 24, wherein the adjustment means is controlled, in use, to operate when the exhaust gas temperature is below 500°C.

26. An exhaust system according to any of claims 7 to 25, wherein the adjustment means comprises a control means comprising a processor.

27. An exhaust system according to claim 26, wherein the processor is part of an engine control unit (ECU).

28. An exhaust system according to claim 26 or 27, wherein the control means adjusts the C1 HC:NO_x ratio in response to one or more of the following inputs: exhaust gas temperature; catalyst bed temperature; rate of exhaust gas mass flow; NO_2 in the exhaust gas; manifold vacuum; ignition timing; engine speed; throttle position; lambda value of the exhaust gas composition; quantity of fuel injected in the engine; position of an exhaust gas recirculation valve; and boost pressure.

29. An exhaust system according to claim 28, wherein the control means is operated according to stored look-up tables or an engine map in response to the at least one input.

30. An exhaust system according to any of claims 7 to 29, wherein the means for adjusting the C1 HC:NO_x ratio comprises at least one of: means for injecting a reductant into the exhaust gas;. means for adjusting the ignition timing of at least one engine cylinder; means for adjusting fuel injection timing of at least one engine cylinder; means for adjusting the engine air-to-fuel ratio; and adjustment of exhaust gas recirculation rate.

31. An exhaust system according to any of claims 7 to 30, wherein the NO_2 decomposition catalyst is disposed downstream of an oxidation catalyst comprising at least one PGM, preferably at least one of platinum and palladium.

32. An exhaust system according to claim 33, comprising a particulate filter between the oxidation catalyst and the NO_2 decomposition catalyst.

33. An exhaust system according to claim 31, wherein the oxidation catalyst is on a particulate filter.

34. An exhaust system according to claim 33, wherein the oxidation catalyst is associated with a NO_x absorbent material

35. An exhaust system according to claim 32, 33 or 34, wherein the NO_2 decomposition catalyst is disposed on a downstream end of the filter

36. An exhaust system according to claim 32, 33, 34 or 35, wherein the filter is a wall-flow filter.

37. An exhaust system according to any of claims 30 to 36, when appendant to claim 30 wherein the reductant injecting means introduces the reductant into the exhaust system upstream of the NO_2 decomposition catalyst and downstream of any PGM oxidation catalyst.

38. An internal combustion engine comprising an exhaust system according to any of claims 7 to 37.

39. An engine according to claim 38 fuelled with diesel fuel, gasoline fuel, natural gas (NG) or liquid petroleum gas (LPG), preferably diesel fuel.

40. A vehicle, such as mining vehicle, comprising an engine according to claim 38 or 39.